JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

COMPREHENSIVE SAFE LEDGER SYSTEM FOR FINANCIAL SERVICES

K. Sukeerthi[1], SD. Abdur Rehman[2], U. John Binny[3], S. Mohan[4], J. Yashwanth[5]
Department of Computer Science and Engineering, Narayana Engineering College, Nellore, Andhra Pradesh, India.

Abstract: *In today's digital era, secure and transparent transaction mechanisms are crucial across various sectors, driving the exploration of advanced ledger technologies. This study examines the development and enhancement of a secure ledger application, addressing the critical need for robust transaction management systems. By integrating intuitive interfaces and streamlined processes, the application aims to boost user efficiency while providing comprehensive insights through transaction tracking and report generation functionalities. The modern business environment increasingly relies on digital transactions, which necessitate highly secure and transparent systems to maintain trust and integrity. Traditional ledger systems often fall short in addressing the complex requirements of contemporary transaction management, leading to vulnerabilities and inefficiencies. This research explores how innovative ledger technologies can fill these gaps, offering enhanced security measures and ensuring data integrity across various industries, including finance, healthcare, supply chain, and more.*

Key words: *Ledger management, Expenses tracing, biometric authentication, Transaction management, Report generation, Transaction tracking, Intuitive interfaces.*

1. INTRODUCTION

In the digital age, the need for secure and efficient transaction management systems has never been more critical. Traditional methods of recording transactions, such as manual entry in ledger books, are fraught with challenges including susceptibility to unauthorized changes, human error, and the inability to generate real-time reports. These limitations pose significant risks and inefficiencies, particularly for wholesalers and retailers who rely on accurate and timely financial data for decision-making.

This paper focuses on the development of a Secure Ledger Application for Android devices, integrating advanced biometric recognition technologies for authentication. The application aims to replace the cumbersome paper-based ledger system with a more secure, convenient, and efficient digital solution. By leveraging biometric data such as fingerprint, the app provides an additional layer of security, ensuring that only authorized users can access sensitive financial information. The Secure Ledger App is designed with two primary user modules: wholesalers and retailers. Wholesalers can manage retailer profiles, create and update accounts, and send real-time notifications to retailers regarding their transactions. Retailers, on the other hand, can view their account status, receive alerts, and conduct transactions directly within the app. This seamless integration of functionalities facilitates better communication and streamlined operations between wholesalers and retailers. The app also includes robust features for tracking income and expenses, generating comprehensive reports, and analyzing financial data.

The implementation of this paper involves the use of technologies such as Java, Android SDK, SQL Lite, and Android Studio 3.x, ensuring a user-friendly interface and reliable performance. The app is designed to be accessible from anywhere, allowing users to manage their financial transactions on the go. By addressing the limitations of traditional ledger systems and incorporating advanced security measures, the Secure Ledger App represents a significant advancement in financial transaction management.

This paper outlines the development process, key features, and benefits of the app, highlighting its potential to transform the way financial data is managed in the wholesale and retail sectors. Through rigorous testing and user training, the paper aims to deliver a robust and user-friendly solution that meets the evolving needs of businesses in the digital era.

1.1 PROBLEM STATEMENT

The existing system depends on a manual process of logging each transaction in physical ledger books. This method not only is time-consuming but also increases the risk of unauthorized modifications being made without the user's awareness, compromising the integrity of financial records. Additionally, the current practice of entering transactions in ledger books does not facilitate the generation of detailed reports, limiting the ability to analyze and review financial data effectively. To address these challenges, we are developing an innovative application designed to replace the outdated paper-based ledger system. This application aims to create a convenient and efficient solution tailored to the needs of both wholesalers and retailers. By digitizing transaction records, the application will enhance security, reduce the potential for errors, and provide robust reporting capabilities. This transition will empower businesses to maintain accurate records, monitor financial activities in real-time, and generate comprehensive reports that support informed decision-making and strategic planning.

1.2 OBJECTIVE OF THE PAPER

This paper aims to develop a secure ledger application designed specifically for Android devices, integrating biometric authentication to enhance access security. Leveraging advanced biometric technologies such as fingerprint and facial recognition, the application will ensure robust protection of financial data against unauthorized access attempts. The primary goal is to provide comprehensive financial management features within the application, allowing users to easily track their income and expenses while generating detailed financial reports for informed decision-making. Additionally, the application will streamline transaction management for shop owners, enabling them to efficiently update retailer account details, record transactions, and promptly notify retailers of account updates.

2. EXISTING WORK

The current ledger system relies predominantly on traditional paper-based accounting books for manually documenting transactions. While historically valued for their simplicity and straightforwardness, this approach presents several notable challenges and limitations in contemporary financial management contexts.

Security Vulnerabilities: Paper-based ledgers lack robust security measures against unauthorized access and tampering. Without encryption protocols or access controls, sensitive financial data remains exposed, susceptible to alterations or unauthorized viewing without detection.

Limited Multi-User Functionality: These systems are not equipped to efficiently support multiple users. In environments where several stakeholders need access to and the ability to update financial records concurrently, the absence of mechanisms to securely manage multiple inputs results in operational inefficiencies and potential delays.

Susceptibility to Human Errors: Manual data entry inherently introduces errors. Mistakes in recording transactions, calculation inaccuracies, and instances of data omission are frequent occurrences, contributing to inaccuracies in financial records that can distort financial reporting and decision-making processes.

Transparency Challenges: Ensuring transparency and traceability in financial transactions proves challenging with paper-based systems. Tracking changes, identifying accountable individuals for specific entries, and maintaining a reliable audit trail pose significant difficulties, potentially compromising accountability and hindering effective audit procedures.

LIMITATIONS OF EXISTING SYSTEM

The following are the limitations for the existing work:

- Manual data input is prone to human mistakes.
- Keeping records in a paper ledger requires significant time investment, as each transaction must be manually documented.
- Accessing information from a distance or sharing it with others presents challenges.
- Conducting analysis or generating reports using paper-based ledgers can be complex.
- Documenting each transaction proves cumbersome in a paper-based ledger.

3. PROPOSED SYSTEM

The proposed system seeks to modernize how wholesalers and retailers manage financial transactions, aiming to overcome the limitations of traditional paper-based ledgers. The Secure Ledger Application improves security, accuracy, and efficiency by automating transactions, providing real-time updates, incorporating biometric security measures, and delivering immediate notifications. These features are integrated into five cohesive modules designed for seamless operation.

Wholesaler Module:

This module is designed for wholesalers to efficiently manage their inventory, place large orders, track shipments, and keep detailed records of transactions with retailers. It helps wholesalers streamline their operations and improve communication with retailers.

Retailer Module:

The Retailer Module assists retailers in managing their inventory, processing customer orders, tracking sales, and handling payments. It provides tools for order management, customer relationship management, and real-time reporting, enhancing retail efficiency and customer service.

Firebase Module:

The Firebase Module integrates advanced cloud services from Firebase into the application. It enhances data management, security, and synchronization across devices, leveraging Firebase's scalable infrastructure for seamless application performance.

Report Module:

The Report Module allows users to generate and customize detailed reports within the application. It enables analysis of transaction data, monitoring of financial performance, tracking of inventory levels, and assessment of sales trends. The module supports data-driven decision-making and strategic planning.

Transaction Module

The Transaction Module facilitates secure processing of financial transactions within the application. It manages payment verification, transaction history tracking, and ensures accuracy and transparency in financial operations. This module is essential for smooth transaction management between wholesalers and retailers.

Each module fulfills specific roles that together form a cohesive and efficient application framework.
The upcoming system will integrate cutting-edge capabilities and seamlessly interface with established financial management procedures. The traditional manual ledger method will be supplanted by a sophisticated Android application featuring enhanced capabilities. This innovative application will introduce real-time updates and enhance communication channels between wholesalers and retailers. Utilizing contemporary technologies like Java and the Android SDK, the application promises exceptional responsiveness, guaranteeing optimal operational performance.

The user interface will undergo significant improvements to enhance ease of use and ensure smoother interaction, thereby enhancing overall user experience. Biometric authentication will be leveraged to secure access, and automated notifications will keep users promptly informed of all transaction updates in real-time. This advanced ledger application aims to deliver a comprehensive and efficient solution for managing financial transactions, effectively addressing the challenges posed by traditional paper-based systems.

ADVANTAGES

- The application will feature an intuitive interface designed for effortless navigation and a smooth user journey.
- The application will provide remote accessibility, enabling users to access it from any location.
- Transactions made through the application will be automatically updated within the system without requiring manual entries.
- Users can securely access the application using biometric data, offering enhanced security compared to traditional password-based authentication methods.

4. EXPERIMENTAL RESULTS

The admin registration screen is meticulously designed to facilitate the secure and efficient onboarding of new administrators. This screen is designed for user sign-up and includes the following elements:

- **Enter the Name**: users are prompted with an input field labeled "Enter the Name," allowing them to type their complete name for identification purposes.
- **Enter the Mobile Number**: There is a "Mobile Number" field, where administrators can provide their contact number, ensuring they can be reached if necessary.
- **Enter the Password**: A “password” input field where users can set and enter their chosen password, with the input obscured for security.
- **Enter the Email**: This is the "Email Address" field, ensuring each administrator's email is recorded for communication and verification.
- **Enter Your Address**: Additionally, the "Residential Address" field is provided, enabling the storage of physical address details for administrative records.
- **Register Button**: At the bottom of the screen, a prominently placed "Register" button allows users to finalize their registration, seamlessly integrating their information into the system and granting them access to the administrative functions they need to perform their duties effectively.

Fig 4.1 Admin Register Screen

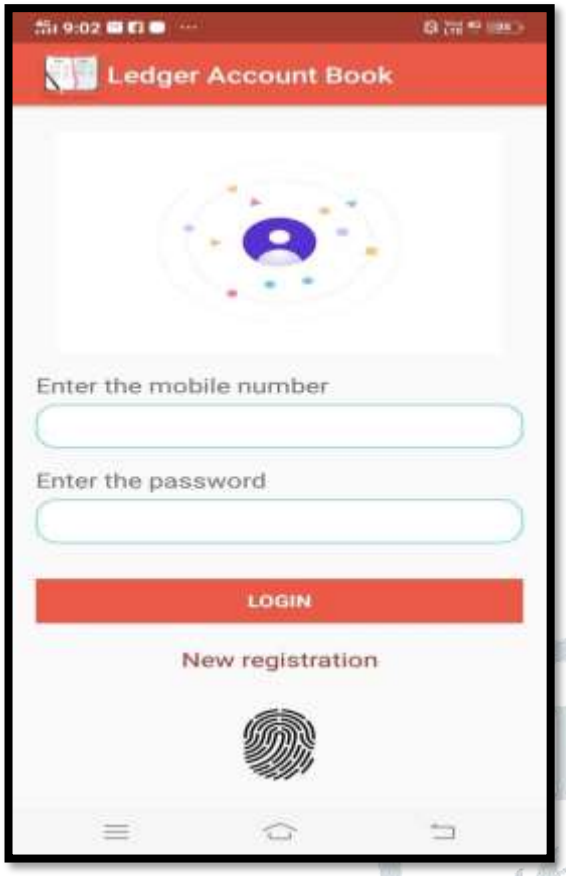

Fig 4.2 Login Screen

- During the sign-in process for the ledger application, users are presented with several authentication methods, balancing security and convenience. They can log in using a combination of their mobile phone number and password or opt for biometric verification for an even easier access experience.
- For the standard login method, users input their registered mobile phone number along with their password to securely access their accounts. This method is widely recognized and trusted, giving users confidence in the protection of their login details.
- Alternatively, users can choose biometric verification, utilizing features such as fingerprint recognition. By employing unique biometric data, the verification process becomes both highly secure and user-friendly

Fig 4.3 Admin Home Page

The admin home screen displays the app name alongside an icon of a ledger book. Below the header are six prominently featured buttons with, each providing a different function within the app.

- **"Add Retailer"**: Allows users to add new retailers.
- **"View Retailer"**: Enables users to view details of existing retailers.
- **"View Credits"**: Provides access to view credit information.
- **"Update Credits"**: Allows users to modify credit details.
- **"View Transactions"**: Enables access to transaction history.

- **"Logout"**: Allows users to log out of the application.

The interface's cleanliness and straightforward layout contribute to a user-friendly experience, ensuring that users can easily navigate through the app and access the desired features without unnecessary complexity or confusion.

Fig: 4.4 Add Retailer Details

During the process of entering retailer details within the application, users can effortlessly input crucial information such as the retailer's name, contact number, and address. By entering the retailer's name, the records are personalized for easy identification. Including the contact number ensures seamless communication and accurate identification, while capturing the address provides essential location information for logistical and correspondence purposes.

Once all the necessary details are entered, users can save the information, ensuring that the retailer profiles are securely stored within the application's database for future reference and use. This streamlined process guarantees that all relevant retailer information is systematically organized and readily accessible.

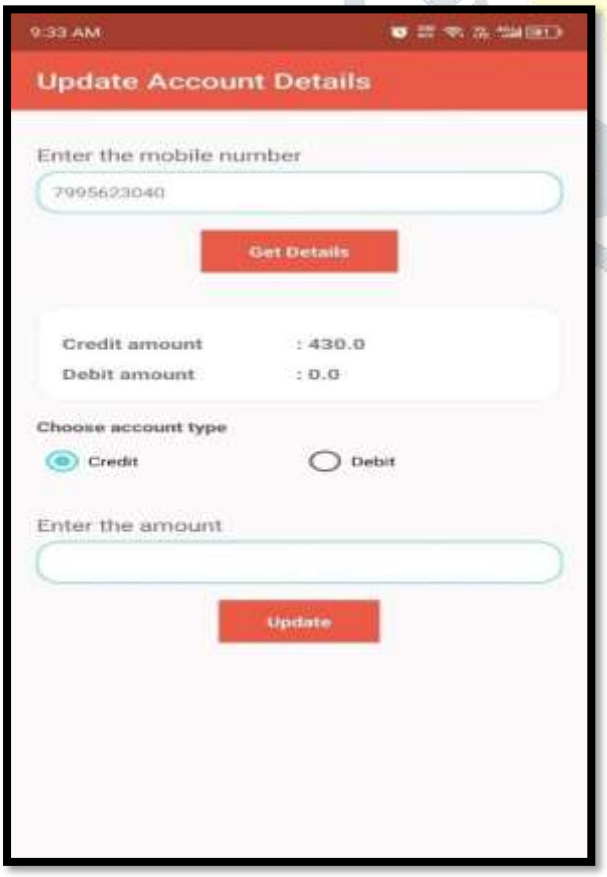

Fig 4.5 Update Account Details

Viewing and updating ledger details for a retailer in the ledger application is essential for maintaining accurate financial records. To view ledger information, begin by accessing the retailer section within the app. Here, you can search for the retailer using their mobile number, ensuring swift retrieval of their data. Once you locate the retailer's profile, navigate to the ledger or transaction history section. Here, you'll find a comprehensive summary of all credits and debits associated with the retailer's account.

For updating ledger details, you can add new transactions to reflect recent activities such as payments received or purchases made. This involves selecting the option to add a new transaction and inputting details like the transaction date, description, amount, and type (credit or debit). By integrating the retailer's mobile number as a search parameter, the ledger app simplifies the process, allowing users to efficiently manage and locate retailer transactions.

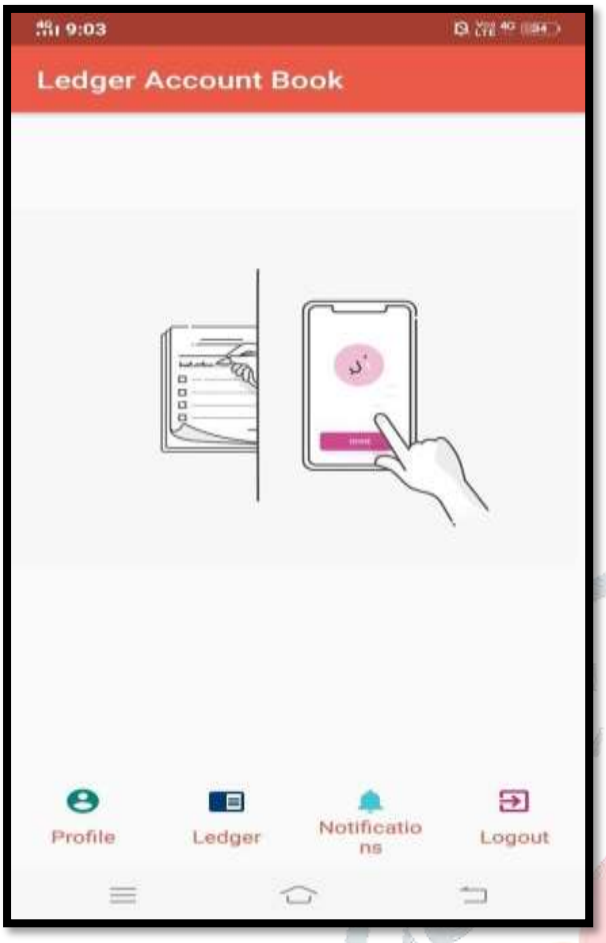

Fig 4.6 Retailer Home Page

In the Retailer homepage of the ledger application, users are provided with a comprehensive interface designed to streamline their financial management experience. The homepage consists of several tabs, including "Profile," "Ledger," "Notifications," and "Logout," each serving a distinct purpose.

- **"Profile"**: Allows users to manage personal details and account settings, ensuring information accuracy.
- **"Ledger"**: Provides a detailed view of transaction history, facilitating effective monitoring of credits, debits, and account balances.
- **"Notifications"**: Keeps users updated with important alerts and updates related to account activities, promoting timely communication and transparency.
- **"Logout"**: Enables secure log out from the account, prioritizing user privacy and data security.

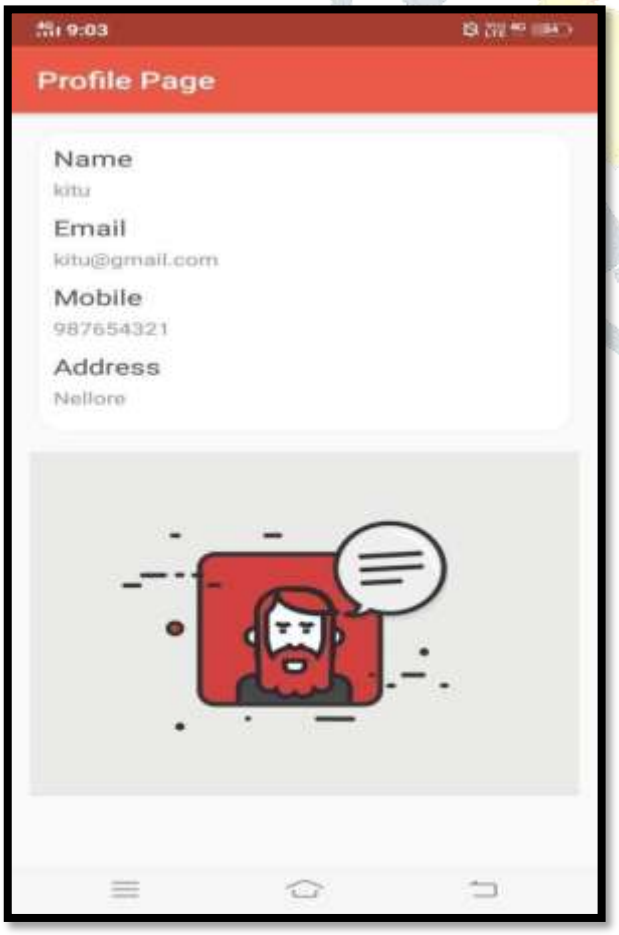

Fig 4.7 Retailer Profile Page

The Retailer profile page within the ledger application serves as a centralized hub where users can seamlessly access and maintain their personal information. Key details such as the Retailer's name, contact number, email address, and physical location are prominently displayed for easy access and updates. This setup allows users to quickly verify and ensure the accuracy of their information, promoting trust and reliability within the platform.

The inclusion of the Retailer's name adds a personal touch to the interface, while the contact number and email address act as primary points of communication, facilitating effective interaction between the user and the application. Moreover, displaying the Retailer's address ensures that their geographic information is readily accessible, assisting in logistical planning and correspondence. Overall, the Retailer profile page offers an intuitive design that empowers users to manage their personal details effortlessly within the ledger application

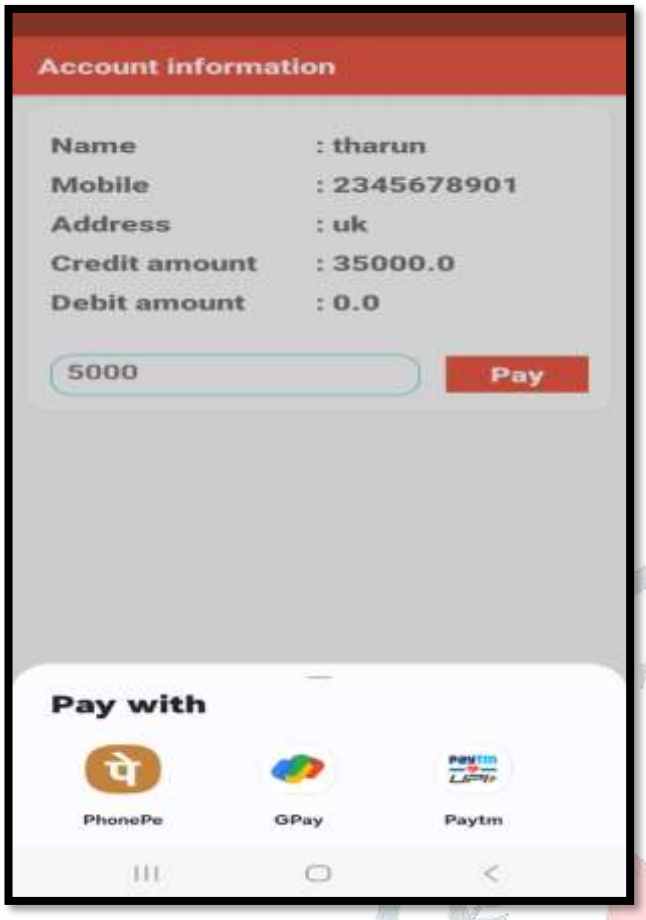

Fig 4.8 Payment Gateway

Within the Retailer ledger account section of the application, users have access to a comprehensive overview of their financial interactions, combining transaction history with personal details for a holistic view. Alongside their personal information such as name, contact number, email, and physical address, users can examine a detailed ledger that displays both credits and debits. This transparency promotes trust and clarity in financial management practices.

Moreover, the application offers convenient online payment options integrated directly into the platform. By incorporating secure online transaction capabilities, users can easily settle outstanding balances or make payments for services rendered with confidence and convenience. This streamlined approach enhances user satisfaction and ensures efficient financial operations within the ledger application, empowering users to manage their accounts effortlessly while safeguarding transaction security.

5. CONCLUSION

The development of the Secure Ledger App marks a significant advancement in the realm of financial management for both wholesalers and retailers. By integrating biometric recognition technologies for authentication, the app ensures a high level of security and user convenience, safeguarding sensitive financial data against unauthorized access. The app's ability to track income, expenses, and generate detailed reports provides users with comprehensive financial oversight, enabling informed decision-making and efficient management of their transactions.

Replacing the traditional, manual ledger-keeping process with a digital, automated system not only minimizes the risk of human error and unauthorized alterations but also streamlines financial operations. The real-time synchronization of transaction data and the provision of instant alert notifications foster improved communication and transparency between shop owners and their customers. This innovation leads to more accurate, accessible, and reliable financial records, promoting better business practices and customer trust.

6. REFERENCES

1. K Ayanlowo et al., “Development of an automated hostel facility management system,” Journal of Science and Engineering, vol. 5, no. 1, pp. 1-10, 2014.

2. C. Leung et al., “Should you use the app for that?” Proceedings of the ACM on Internet Measurement Conference, pp. 365-372, 2016.

3. A. Abadi et al, “Mobile computing to support sustainability,” Proceedings of the 3rd International Workshop on Mobile Development Lifecycle, pp. 54-57, 2015.

4. Z. A. Nasruddin et al., “Evaluating construction defect mobile application using think aloud,” Malaysian Journal of Computing, vol. 2, no. 2, pp. 162-171, 2018.

5. G. V. Bharambe, “Analytical study for the development of smart campus in college,” Imperial Journal of Interdisciplinary Research, vol. 3, no. 1, pp. 1687-1693, 2017.